REMARKS

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 1-8, 10-13 and 16 are now present in the application. Claims 1, 8 and 13 have been amended. Claims 14 and 15 have been cancelled. Claims 1, 8 and 13 are independent. Reconsideration of this application, as amended, is respectfully requested.

Allowable Subject Matter

The Examiner has indicated that claims 1-7 are allowed. Applicant greatly appreciates the indication of allowable subject matter by the Examiner. As the Examiner will note, in view of the foregoing amendments, all pending claims should be allowable.

Claim Objections

Claims 1 and 8 have been objected to due to the presence of minor informalities. In view of the foregoing amendments, in which the Examiner's helpful suggestions have been followed, it is respectfully submitted that this objection has been addressed. Accordingly, Applicant respectfully submits that this objection has been obviated and/or rendered moot. Reconsideration and withdrawal of this objection are respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 8 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukutani, U.S. Patent No. 5,998,898, in view of Kuwayama, U.S. Patent No. 5,874,793. Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over

Fukutani in view of Kuwayama, and further in view of Komatsu, U.S. Patent No. 5,763,344. Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukutani in view of Kuwayama, and further in view of Davies, U.S. Patent No. 4,865,922. Claims 13-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka, U.S. Patent No. 6,712,513, in view of Kuwayama. Claim 16 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka in view of Kuwayama, and further in view of Komatsu. These rejections are respectfully traversed.

In light of the foregoing amendments to the claims, Applicant respectfully submits that these rejections have been obviated and/or rendered moot.

Independent claim 8 now recites "[a] supporting device of a rotor applied to at least one of a fan and a hard disk machine" and "a spacing between said outer surface of said ceramic axial tube and said inner surface of said ceramic axial support is within the range of 2-25 μm for dispersing lubricants therefrom".

Independent claim 13 now recites "[a] supporting device of a rotor applied to at least one of a fan and a hard disk machine" and "at least one of the ceramic axial tube and the ceramic axial support is formed as a non-cylindrical surface"

Support for the above combinations can be found on page 1, first paragraph, page 3, third paragraph, and page 7, lines 1-4. Applicant respectfully submits that the above combinations of elements as set forth in amended independent claims 1 and 8 are not disclosed nor suggested by the references relied on by the Examiner.

Applicant respectfully submits that the utilized references are applied to "dynamic bearing motors" and are designed in a contact-free manner. The lubricating fluid employed therein is to generate a hydrodynamic bearing effect. Unlike the utilized

references, the present invention is applied to a rotor of a fan or a rotation shaft of a hard disc machine as recited in claim 1, and is designed in a contact manner. The lubricating fluid employed therein is to reduce the friction and noise. Accordingly, the technical field of the present invention, applications thereof, and the problem to be solved are fundamentally different from those of the utilized references. Therefore, it is improper to use those references against the present invention.

With regard to claim 8, Fukutani discloses a dynamic bearing (col. 6, lines 54-67; col. 7, lines 1-4) including a shaft 12, a sleeve 21 and a thrust plate 22, wherein the space between the shaft and the sleeve as well as between the shaft and the thrust plate is filled up by a lubricating fluid. Instead of storing the lubricating fluid, Fukutani discloses that Herringbone grooves 21a and 21b formed axially with some intervals on the inner wall of the sleeve 21 or on the surface of the shaft 12 act together with the thrust plate 22 to produce dynamic pressure in the lubricating fluid during the spinning of the shaft 12, so that the radial spinning of the shaft 12 is in a contact-free manner (see col. 6, lines 64-67). Meanwhile, as the dynamic bearing is designed to be completely airtight as suggested by Fukutani, thrust plate 22 and other components therefore must of necessity be formed in such a system in order to bear the thrust load generated by the rotation of the shaft 12. However, it is difficult to fill in the lubricating fluid again due to the airtight design of Fukutani, thereby causing undesirable shacking, abrasions and damages.

Unlike Fukutani, at least one of the concaves formed in the present invention is used to store the lubricating fluid so as to reduce friction and noise generated by the contact rotation occurring between the axial tube and axial support. Accordingly, the structure of the present invention is substantively different from Fukutani, and the cost of

making the thrust plate 22 and other components (suggested by Fukutani) can also be avoided to reduce the total cost of production. Furthermore, as the dimensions of groove angle and width of the herringbone grooves 21a and 21b disclosed in Fukutani (col. 8, lines 66-67; col. 9, lines 1-3) are influential factors in producing force of dynamic pressure, a higher-precision is required during manufacturing in Fukutani. Moreover, as described in Fukutani, the grooves 21a and 22b are one of the predominant factors influencing the direction of the shaft 12 and the performance of the dynamic bearing. Therefore, they need to be made by a more rigid material. However, the plating thickness will also affect the dimensions of the grooves and thereby limits the range of available materials made thereof. On the contrary, the concave suggested in the present invention does not cause those problems.

In addition, the spacing between the axial tube and the axial support disclosed in the present specification allows the lubricating fluid to be added therein at anytime. Unlike the present invention, Fukutani's structure uses the lubricating fluid to support the shaft and becomes ill functioned due to serious shacking and abrasion when running out of lubricating fluid. Since the present invention does not use the lubricating fluid to support the shaft, running out of the lubricating fluid only results in lower wind speed and slightly higher noise level, but the device can still function well. Apparently, the structure of the present invention is improved with a better performance than Fukutani's structure.

Kuwayama also discloses a contact-free rotor assembly having a rotor which is restricted from moving in the axial direction by a magnetic bearing that also plays a role in the axis of rotation by balancing the magnetic attracting force thereof, and gaps which

have to be measured and formed in a high precision standard between the magnetized portion along the outer side of the rotor and the ring-shaped magnet and between the stationary shaft and the rotary shaft, in order to allow the radial pneumatic dynamic pressure bearings to generate a high but adequate dynamic pressure for smooth rotation of the rotor. Contrary to Kuwayama's disclosure, the present invention provides an improved rotor's supporting device for contact rotation, comprising an axial support and an axial tube having one end closed by a rotor and the other end sealed by a lid, wherein the axial movement of the axial tube is regulated by the lid. Further, the spacing between the axial tube and the axial support is formed within 2-25 μm, and may optionally store the lubricating fluid to reduce the friction and noise occurred therebetween. As the gaps recited in Kuwayama are not used for storing the lubricating fluid to reduce frictional noise, undesired abrasion and heat production as suggested by the present invention, but for allowing the high dynamic pressure to be generated and preventing dead lock, the present invention is therefore substantially distinctive and improved from Kuwayama, Fukutani or any combination thereof. Therefore, it is respectfully submitted that amended independent claim 8 clearly defines over Fukutani in view of Kuwayama.

With regard to claim 13, this claim has been amended to incorporate the subject matter of claims 14 and 15. Further, independent claim 13 has also been amended for that very reason as aforementioned to expedite the prosecution. As mentioned, Kuwayama has a substantially different structure and purpose from the present invention. Moreover, Tanaka discloses a fluid bearing device requiring alloys of mutually different compositions to form the major components thereof and the formation of grooves to generate dynamic pressure therefrom. Thus, Tanaka's manufacturing processing is also

different and more elaborated than the present invention, not to mention the disparate structure, purpose and means of Tanaka's disclosure. The manufacturing process of the present invention is simple, novel and non-obvious, and can be applied to large-scale production and wider range of applications. Therefore, it is respectfully submitted that amended independent claim 13 clearly defines over Tanaka in view of Kuwayama.

With regard to the Examiner's reliance on Komatsu and Davies, these references have only been relied on for their teachings related to the subject matter of dependent claims. These references also fail to disclose the combinations of elements as set forth in amended independent claims 8 and 13. Accordingly, these references fail to cure the deficiencies of Fukutani, Kuwayama, and Tanaka.

Accordingly, none of the references utilized by the Examiner individually or in combination teach or suggest the limitations of amended independent claims 8 and 13 or their dependent claims. Therefore, Applicant respectfully submits that claims 8 and 13 and their dependent claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

CONCLUSION

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____
Joe McKinney Muncy
Reg. No. 32,334

KM/GH/mmi
0698-0189PUS1

P. O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000